THE WEATHER ELEMENTS

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PRESSURE AND WINDS

The atmospheric circulation during September, 1924, became more active than had been the case for several preceding months, and, as is to be expected, with the beginning of autumn. This was particularly the case over the southeastern districts, which were more or less affected by two tropical storms that passed over the Florida Peninsula and moved northeastward along the Atlantic coast; a third, threatening the southeastern districts at the beginning of the month, moved northeastward between the Bermuda Islands and the Atlantic coast, giving high winds over portions of the trans-Atlantic steamship routes.

Except as indicated above, the cyclonic storms were mainly without importance, although on the 1st and 2d a low-pressure area moving from the southern Plains to the middle Atlantic coast brought general rains, heavy in a few localities, over most districts from the eastern Plains to the Atlantic coast. Also from the 8th to 10th a disturbance of moderate intensity brought general rains from the lower Missouri and upper Mississippi Valleys eastward and southeastward to the Atlantic coast, the falls becoming heavy along the coast from Chesapeake Bay to Maine.

More or less rain occurred from the 11th to the 13th over the central valleys and Great Lakes region, attending the progress of a slight barometric depression moving from the southern Plains to the northward of Lake Superior.

The tropical disturbance which approached the west Florida coast on the morning of the 14th crossed the northern portion of that State and moved northeastward along the Atlantic coast during the following few days. It was attended by some extraordinarily heavy rains in portions of the southeastern States, notably in western Florida, where from 10 to nearly 15 inches fell during the storm. A full report of this storm will be found elsewhere in this issue.

An important rain area developed over the southern Plains about the 18th and moved to the vicinity of Lake Michigan by the morning of the 20th, attended by rather general rains over the central valleys. This was immediately followed by another pursuing a similar course, and developing considerable energy as it approached the upper Lakes. This storm gave wide precipitation over the central valleys and eastern districts, with heavy falls from the lower Mississippi Valley northeastward to the Great Lakes.

Following the tropical storm over the southeastern States near the middle of the month, rainy conditions persisted over much of this district during the remainder of the month, particularly in Georgia, the Carolinas, and near-by portions of adjacent States.

The last important storm of the month over the interior districts had its origin in the central Rocky Mountains about the middle of the third decade, though little rainfall occurred until about the 27th, when it had overspread much of the Great Plains. By the 28th this rainy condition extended into the Mississippi Valley and Gulf States, and during the following 24 hours into the Atlantic coast districts, where rains became heavy to excessive. At the same time another tropical disturbance had developed in the east Gulf and moved over northern Florida during the night of the 29th, and northeastward along the Atlantic coast on the 30th. This storm was attended by unusually heavy rains over western and northern Florida, southern Georgia, and generally over the Atlantic Coast States, northward to New York. A full account of it and the attending floods also appears elsewhere in this issue.

Anticyclonic conditions prevailed frequently over the interior and northeastern portions of the country, particularly in the last-named district, where they dominated the weather during the greater part of the latter half of the month.

The average pressure for the month was above normal over the interior and northeastern portions of the country, and decidedly higher than in the preceding month over nearly all parts of the United States as well as over Canada, only small areas along the Gulf and Pacific coasts having averages less than in August.

The low pressures attending the two tropical storms which passed over the Southeastern States caused monthly averages less than normal in that region, and the averages over the Pacific Coast States and in the western Canadian Provinces were likewise less than normal.

Wind velocities were mainly not high over extensive areas, save in portions of Wisconsin on the 21st in connection with a series of tornadoes. These caused much property damage and considerable loss of life, details of which appear in the table of severe storms at the end of this section. High velocities occurred along the Atlantic coast in connection with the two tropical storms. Other high winds were mainly associated with local thunderstorms.

TEMPERATURE

The feature of the weather for September showing the most notable departure from usual conditions was the persistent coolness over all central and eastern portions. This was the more notable because it represented a continuance of conditions that had prevailed over much of that territory for many preceding months.

The low averages were mainly the result of continued cool weather, as notable coolness occurred on only a few dates, and daily changes were mainly small.

The first important cold spell, threatening frost, followed the cyclonic storm which moved northeastward to the upper Lakes on the 21st, when high pressure following the storm brought sharp falls of 20° to 30° in temperature over large portions of the central valleys, while frost more or less severe occurred in the northern portions of the Rocky Mountain regions and adjacent portions of the Great Plains. Following this no important frosts occurred until near the end of the month when an anticyclone of wide extent overspread the central valleys, producing conditions favorable for high night radiation, and caused heavy to killing frosts generally from the Missouri Valley to the Great Lakes, and lighter frosts, occasionally killing, considerably farther south.

The main warm periods of the month were during the early portions, notably on the 1st, over practically all sections from the Mississippi Valley eastward; on the 3d and 4th from the Dakotas westward and southwestward; and in portions of the middle and southern Great Plains on the 6th to 8th.

In parts of Montana the maxim m temperatures of the 4th were the highest ever observed so late in the season. In the Great Plains maximum temperatures

for the month were mainly above 100°, and they were as high, and locally higher, in most of the States from the Rocky Mountains westward; also over the Gulf and Atlantic Coast States as far north as Maryland.

The dates of the lowest temperatures were widely scattered, though they occurred mainly toward the latter part of the month. Freezing temperatures were reported from practically all northern and central States, though often these were largely local, due to elevation or to conditions favorable for night radiation. The lowest observed, 5°, was reported from a point in the mountains of Idaho, while in Florida the lowest reported was 43°.

The mean temperature for the month was below normal in all parts of the country from the Rocky Mountains eastward, save along the immediate Gulf coast. Over the central valleys and thence eastward to the Atlantic coast the month as a whole was among the coldest of record for September; in fact at a few points it was the coldest, while over large portions of the Mississippi Valley and to the eastward, with the exception of 1918, it was the coldest September in 50 years. West of the Rocky Mountains the monthly averages were above normal save along the immediate Pacific coast, while in the Canadian Northwestern Provinces, particularly over the more northern districts from which records are available, the month was decidedly warm.

PRECIPITATION

Second among the unusual weather conditions of the month stands out the excessive precipitation that occurred over portions of the Southeastern States during the passage of the two tropical storms over that region. At Apalachicola, Fla., a total of 27.73 inches was recorded, the greater part of which occurred in connection with the two storms referred to above. In a period of slightly more than 38 hours on the 13th to 15th there was a fall of 14.25 inches, while in slightly less than 28 hours on the 28th and 29th, a total of 9.53 inches occurred.

Precipitation nearly as great as that noted in Florida occurred over much of Georgia and the Carolinas, and to a lesser degree to the northward as far as Maryland and Pennsylvania. Over many portions of this area the monthly precipitation was the greatest ever measured in September, and in some localities it was the greatest reported in any month of record.

In striking contrast with the heavy precipitation over the Southeastern States may be mentioned the nearly complete absence of precipitation in portions of Texas, particularly in the vicinity of Galveston, and over much of Louisiana, which, as a whole, had the driest September of record. At Galveston the precipitation was the least for September in more than 50 years, and as practically no precipitation had occurred there during July and less than half an inch in August, the total deficiency for the three months, July to September, amounts to nearly 15 inches.

Dry weather continued over most districts west of the Rocky Mountains, particularly in California and Nevada, where drought conditions have persisted almost generally for a year or more.

The fire hazard in most of the western forest reserves abated little if any during the month and further damage occurred.

Over the western portions of Oregon and Washington there was slightly more precipitation than usually occurs in September.

In general, precipitation was above the normal from the Ohio Valley northeastward, eastward and southeastward to the Atlantic coast, the excesses becoming larger as a rule toward the coast. There was a moderate excess from the Dakotas eastward to Lake Superior, and locally over a narrow area from Missouri and eastern Kansas southwestward to the Rio Grande, also over small areas in western Nebraska, western Kansas, and the adjacent portions of Colorado and Wyoming, and in northern Arizona. Elsewhere precipitation was mainly less than average, though the deficiencies were small.

SNOWFALL

Measurable amounts of snow were reported from high elevations in the western mountain districts, the greatest fall reported being 14 inches, at a point in Colorado. Slight falls were reported from the mountains of northern New York and locally in North Dakota and other northern States.

HUMIDITY AND SUNSHINE

The relative amounts of moisture in the atmosphere varied generally with the precipitation, but the ranges were mainly small, except in the districts west of the Rocky Mountains where the deficiencies ranged up to nearly 15 per cent. There were similar deficiencies in the west Gulf States and westward to New Mexico.

There was much sunshine in the Southwest, notably in Arizona where the last 15 days were practically cloudless and in the Great Valley of California where there was nearly constant sunshine, which greatly advanced the drying of fruits. In other districts west of the Mississippi River there was mainly abundant sunshine. East of the Mississippi more cloudy weather occurred, particularly over the Middle and South Atlantic States where the latter part of the month had much cloudy, rainy weather.